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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/660,779 | 09/12/2003 | Mun-Pyo Hong | 6192.0159.D2 | 5768 |

7590 09/06/2005
McGuireWoods LLP
Suite 1800
1750 Tysons Boulevard
McLean, VA 22102

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| EXAMINER |
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WEISS, HOWARD

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| ART UNIT | PAPER NUMBER |
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2814

DATE MAILED: 09/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/660,779 | HONG ET AL. | |
| | Examiner | Art Unit | |
| | Howard Weiss | 2814 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 28-30 ~~is~~ are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 28-30 ~~is~~ are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Attorney's Docket Number: 6192.0159.D2

Filing Date: 9/12/03

Continuing Data: Division of 09/676,813 (10/2/00 now U.S. Patent No. 6,674,495); RCE
established 7/14/05

Claimed Foreign Priority Date: 9/30/00, 12/27/99, 9/4/00 (KRX)

Applicant(s): Hong et al. (Hong, Kim, Rho, Kang, Kim)

Examiner: Howard Weiss

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7/14/05 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:
 - (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mishima et al. (JP 02-179977), Kaneko (JP 06-77483) and Huang et al. (U.S. Patent No. 5,354,700).

Mishima et al. show most aspects of the instant invention (e.g. Figures 1, 3, 4 and 7) including:

- a plurality of pixels defined by gate and data lines
- a plurality of thin film transistors and pixel electrodes
- said transistors each having an amorphous silicon (aSi) semiconductor layer **24** and an ohmic layer **26**

Mishima et al. do not show the semiconductor layer comprising a double-layered structure with an upper aSi layer with a lower band gap than a lower aSi layer. Kaneko teaches (e.g. Figure 1) to use a semiconductor layer **3** comprising a double-layered structure with upper **3b** and lower **3a** aSi layers to form a thin-film transistor whose throughput is not spoiled and is of good characteristics (see Constitution). It would have been obvious to a person of ordinary skill in the art at the time of invention to use a semiconductor layer comprising a double-layered structure with upper and lower aSi layers as taught by Kaneko in the device of Mishima et al. to form a thin-film transistor whose throughput is not spoiled and is of good characteristics.

Huang et al. teaches (e.g. Figure 2) to form a semiconductor layer with the upper layer **36** having a lower band gap than the lower layer **35** to provide a transistor with high mobility, high transconductance and excellent hot carrier immunity (Column 1 Lines 24 to 27). It would have been obvious to a person of ordinary skill in the art at the time of invention to form a semiconductor layer with the upper layer having a lower band gap than the lower layer as taught by Huang et al. in the device of Mishima et al. to provide a transistor with high mobility, high transconductance and excellent hot carrier immunity.

4. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakanishi et al. (U.S. Patent No. 6,548,828), Rho et al. (U.S. Patent No. 6,057,8963) and Kobayashi (U.S. Patent No. 5,202,572).

Nakanishi et al. show most aspects of the instant invention (e.g. Figures 1 and 2 and Column 1 Lines 63 to 67) including:

- a plurality of pixels defined by gate and data lines
- a plurality of thin film transistors and pixel electrodes
- said thin film transistors having a gate insulating layer includes lower **23** and upper **24** layers

Nakanishi et al. do not show the use of amorphous silicon nitride or organic material as gate insulating material. Kobayashi teaches (e.g. Figure 6(G) and Column 5 Lines 54 to 58) to use amorphous silicon nitride for gate material **30** to provide a thin film transistor with smaller variation of the on/off currents (Column 3 Lines 6 to 10). It would have been obvious to a person of ordinary skill in the art at the time of invention to use amorphous silicon nitride for gate material as taught by Kobayashi in the device of Nakanishi et al. to provide a thin film transistor with smaller variation of the on/off currents.

Rho et al. teach (e.g. Column 2 Lines 54 to 57) to use organic material as gate insulating material to reduce the parasitic capacitance between the gate and drain electrodes. It would have been obvious to a person of ordinary skill in the art at the time of invention to use organic material as gate insulating material as taught by Rho et al. in the device of Nakanishi et al. to reduce the parasitic capacitance between the gate and drain electrodes.

Response to Arguments

5. Applicant's arguments filed 6/10/05 have been fully considered but they are not persuasive. In response to applicant's arguments against the references individually,

one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The band gap differences in the layers is specifically taught by Huang et al. (Column 2 Lines 22 to 29). The use of the lower band-gap material (i.e. SiGe) with the higher band gap material (i.e. Si), separate from the thicknesses, give the advantages as described. Similarly, Rho et al. teach the use of organic material and Kobayashi teaches to use amorphous silicon nitride, both for gate material. These features are independent from other features described in the references. The combination of these references with the other prior art anticipate the instant invention as claimed. For these reasons and those set forth in the present office action, the pending claims remain rejected.

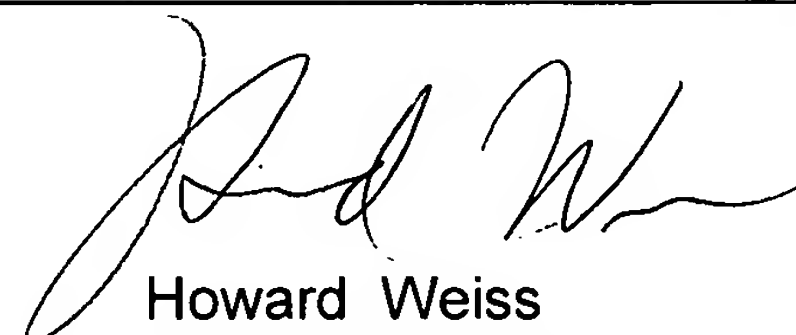
Conclusion

6. Papers related to this application may be submitted directly to Art Unit 2814 by facsimile transmission. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2814 Fax Center number is **(571) 273-8300**. The Art Unit 2814 Fax Center is to be used only for papers related to Art Unit 2814 applications.
7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Howard Weiss at **(571) 272-1720** and between the hours of 7:00 AM to 3:00 PM (Eastern Standard Time) Monday through Friday or by e-mail via Howard.Weiss@uspto.gov. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy, can be reached on **(571) 272-1705**.

8. The following list is the Examiner's field of search for the present Office Action:

| Field of Search | Date |
|--|-------------|
| U.S. Class / Subclass(es): 257/ 59, 63; 349/43 | thru 9/1/05 |
| Other Documentation: none | |
| Electronic Database(s): EAST, IEL | thru 9/1/05 |

HW/hw
2 September 2005


Howard Weiss
Primary Examiner
Art Unit 2814